



2013 Building Energy Efficiency Standards Workshop

Solar Water Heating
(single family residential)



Single Family & Specialty Commercial Solar Water Heating

Outline

- Proposed Code Change
- Methodology
- Results
- Proposed Code Change Language
- Questions & Comments



Single Family Solar Water Heating

Code Change Proposals – Base Code

- Prescriptive:
 - In **Package C**, increase current solar fraction requirement for electric storage water heating to 50% and provide an additional prescriptive option. Current requirement for Package C is 25% solar fraction
 - Revise language and visual representation of solar fraction requirement.
- Changes will bring Package C closer to equivalent of Package D



Single Family Solar Water Heating Methodology

- Modeled Proposed Standards Case (TRNSYS)
 - Residential Active Indirect Glycol w/ Electric Storage
 - 16 Climate Zones
- Compared to Base Case (no solar system)
- Assumptions, formulas and energy savings in CASE Report



Single Family Solar Water Heating Methodology

- Calculation of Solar Fraction
 - Proposed Standards Case
 - Annual Solar Fraction (SRCC) = $1 - EF / SEF$
 - $SEF = Q_{del} / (Q_{aux} + Q_{par})$
 - Q_{del} = Energy delivered to the hot water load (TESS 2011)
 - Q_{aux} = Annual amount of energy used by the auxiliary water heater or backup element with a solar system operating (TESS 2011)
 - Q_{par} = Parasitic energy: Annual amounts of AC electrical energy used to power pumps, controllers, shutters, trackers, or any other item needed to operate the SDHW system (TESS 2011)



Single Family Solar Water Heating Proposed Code Language

- Section 151
 - Revise & Add: **language to read as follows:**
 - **“Domestic Water-heating systems.** Water heating systems shall meet the requirements of either A, B, C or D and meet the requirements of E and F or shall meet the requirements of Section 151(b)1.
 - D. For systems serving individual dwelling units, electric-resistance water heating may be installed as the main water heating source in Package C only if natural gas is unavailable and only if the water heater is located within the building envelope and is served by a solar water heating system that has a calculated solar fraction no less than 50% and has or a system having the following characteristics:



Single Family Solar Water Heating Proposed Code Language

- Footnote requirements to TABLE 151-B, TABLE 151-C and TABLE 151-D
 - ~~7. Electric-resistance water heating may be installed as the main water heating source in Package C only if the water heater is located within the building envelope and a minimum of 25 percent of the energy for water heating is provided by a passive or active solar system~~



QUESTIONS & COMMENTS